WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ. ID. NO: 1.

2. An isolated nucleic acid molecule comprising:

(a) a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO: 2; or

(b) the complement of the nucleotide sequence of (a).

3. An isolated nucleic acid molecule of claim 1, which is cDNA.

4. An isolated nucleic acid molecule of claim 1, which is RNA.

5. A recombinant vector comprising the nucleotide sequence of claim 1, 2 or 3.

6. An expression vector comprising the nucleotide sequence of claim 1, 2 or 3 operatively associated with a regulatory nucleotide sequence containing transcriptional and translational regulatory information that controls expression of the nucleotide sequence in a host cell.

7. A genetically engineered host cell comprising the nucleotide sequence of claim 1, 2, or 3.

8. A genetically engineered host cell comprising the nucleotide sequence of claim 1, 2 or 3 operatively association with a regulatory sequence containing transcriptional and translational regulatory units that controls expression of the nucleotide sequence in the host cell.

9. A genetically engineered host cell of claim 8 wherein the host cell is prokaryotic.

10. A genetically engineered host cell of claim 8 wherein the host cell is eukaryotic.

11. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ. ID. NO: 3.

12. An isolated nucleic acid molecule comprising:

(a) a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO: 4; or

(b) the complement of the nucleotide sequence of (a).

13. An isolated nucleic acid molecule of claim 11, which is cDNA.

14. An isolated nucleic acid molecule of claim 11, which is RNA.

15. A recombinant vector comprising the nucleotide sequence of claim 11, 12 or 13.

16. An expression vector comprising the nucleotide sequence of claim 11, 12 or 13 operatively associated with a regulatory nucleotide sequence containing transcriptional and translational regulatory information that controls expression of the nucleotide sequence in a host cell.

17. A genetically engineered host cell comprising the nucleotide sequence of claim 11, 12 or 13.

18. A genetically engineered host cell comprising the nucleotide sequence of claim 11, 12 or 13 operatively linked to a regulatory sequence containing transcriptional and translational regulatory units that controls expression of the nucleotide sequence in the host cell.

19. A genetically engineered host cell of claim 18 wherein the host cell is prokaryotic.

20. A genetically engineered host cell of claim 18 wherein the host cell is eukaryotic.

21. An antibody that specifically binds to a peptide consisting of the C-terminal portion of the MAPK5 amino acid sequence set forth in SEQ. ID. NO:2 or SEQ. ID. NO:4.

22. A monoclonal antibody of claim 21.

23. A polyclonal antibody of claim 21.

24. A polypeptide which has kinase activity comprising the amino acid sequence of SEQ. ID. NO: 2.

25. An isolated MAPK5 protein having kinase activity comprising the amino acid sequence of SEQ. ID. NO: 2.

26. An engineered host cell of claim 8 or 18 in which the host cell is a continuous cell line.

27. A transgenic plant transformed by a nucleotide sequence that encodes a polypeptide consisting of amino acid sequence of MAPK5 ortholog wherein overexpression of the MAPK5 ortholog in the plant results in increased tolerance to abiotic stress compared to a wild-type plant.

28. A transgenic plant transformed by a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO: 2 wherein overexpression of SEQ. ID. NO: 2 in the plant results in increased tolerance to abiotic stress compared to a wild-type plant.

29. A transgenic plant transformed by a nucleotide sequence that encodes RNA interference structure wherein suppression of the MAPK5 ortholog nucleic acid

sequence in the plant results in increased resistance to biotic stress compared to a wild-type plant.

30. A transgenic plant transformed by a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO:2 wherein suppression of the expression of SEQ. ID. NO:2 in the plant results in increased resistance to biotic stress as compared to wild-type plant. .

31. A transgenic plant transformed by a nucleotide sequence that encodes a MAPK5 ortholog nucleic acid sequence operatively linked to a regulatory sequence that controls gene expression so that the MAPK5 ortholog nucleic acid sequence is overexpressed in the plant compared to a wild-type plant.

32. A transgenic plant transformed by a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO: 2 operatively linked to a regulatory sequence that controls gene expression so that SEQ. ID. NO: 2 is overexpressed in the plant compared to a wild-type plant.

33. A transgenic plant transformed by a nucleotide sequence that encodes a MAPK5 ortholog nucleic acid sequence operatively linked to a regulatory sequence that controls gene expression so that expression of the MAPK5 ortholog nucleic acid sequence is suppressed in the plant compared to a wild-type plant.

34. A transgenic plant transformed by a nucleotide sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ. ID. NO: 2 operatively linked to a regulatory sequence that controls gene expression so that expression of SEQ. ID. NO: 2 is suppressed in the plant compared to a wild-type plant.

35. A transgenic plant of claim 27, 29, 31 or 33 wherein the MAPK5 nucleic acid is from a monocot.

36. A transgenic plant of claim 27 or 28 wherein the abiotic stress is selected from the group consisting of temperature, drought and salinity.

37. A transgenic plant of claim 29 or 30 wherein the disease is selected from the group consisting of pathogenic fungi, bacteria, viruses, nematodes and insects.

38. A seed produced by a transgenic plant of claim 27, 28, 29, 30, 31, 32, 33 or 34.

39. A mitogen-activated protein kinase produced by a transgenic plant of claim 27, 28, 29, 30, 31, 32, 33 or 34.

40. A method for evaluating a plant for tolerance to abiotic stress comprising:

(a) treating a plant with abiotic stress;

(b) isolating MAPK5 protein from the plant;

(c) detecting for MAPK5 activity; and

(d) evaluating the increase or decrease in MAPK5 activity in the plant whereby the increase in MAPK5 activity indicates the plant is tolerant to abiotic stress.

41. A method for evaluating a plant for resistance to biotic stress comprising:

(a) treating a plant with a pathogen;

(b) isolating MAPK5 protein from the plant;

(c) detecting for MAPK5 activity; and

(d) evaluating the increase or decrease in MAPK5 activity in the plant whereby the decrease in MAPK5 activity indicates the plant is tolerant to the pathogen.

42. A method for enhancing tolerance to abiotic stress in a plant comprising:

(a) transforming a plant with MAPK5 nucleic acid sequence wherein the MAPK5 protein is expressed in the plant;

(b) treating a plant with an abiotic stress;

(c) isolating MAPK5 protein from the plant;

(c) detecting for MAPK5 activity; and

(d) evaluating the increase or decrease in MAPK5 activity in the transformed plant whereby the increase in MAPK5 activity indicates the increase in tolerance to abiotic stress in the transformed plant compared to the wild-type plant.

43. A method for increasing resistance to biotic stress in a plant comprising:

(a) transforming a plant with MAPK5 nucleic acid sequence wherein the MAPK5 protein is expressed in the plant;

(b) treating a plant with a biotic stress;

(c) isolating MAPK5 protein from the plant;

(c) detecting for MAPK5 activity; and

(d) evaluating the increase or decrease in MAPK5 activity in the transformed plant whereby the decrease in MAPK5 activity indicates the increase resistance biotic stress in the transformed plant compared to the wild-type plant.

44. The method of claim 40, 41, 42 or 43 wherein the isolating step comprises immunospecifically binding MAPK5 protein to an MAPK5 antibody.

45. The method of claim 40 or 42, wherein the abiotic stress is selecting from the group consisting of drought, temperature or salinity.

46. The method of claim 38 or 40, wherein the biotic stress is selecting from the group consisting of pathogenic fungi, bacteria, viruses, nematodes and insects.

47. An isolated nucleic acid probe that comprises a label and (a) nucleotide sequence that encodes a polypeptide consisting essentially the amino sequence of SEQ. ID. NO:2 or (b) the complement of (a).

48. An isolated nucleic acid probe that comprises a label and (a) nucleotide sequence that encodes a polypeptide consisting essentially the amino sequence of SEQ. ID. NO:4 or (b) the complement of (a).

49. A kit for screening a plant for susceptibility to biotic stress comprising the nucleic acid probe of claim 47 or 48 and at least one reagent suitable for detecting the presence of a nucleic acid molecule encoding MAPK5 whereby the changes in polymorphic patterns of MAPK5 indicates the plant is susceptible to biotic stress.

50. A kit for detecting a plant for tolerance to abiotic stress comprising:

(a) an antibody that immunospecifically binds to a MAPK5 polypeptide wherein the antibody is labeled; and

(b) at least one reagent suitable for detecting the presence of MAPK5 whereby the increase or decrease in MAPK5 activity indicates the plant is tolerant to abiotic stress.